

REMARKS

Claims 1-20 are pending in the case. Further examination and reconsideration of pending claims 1-20 are respectfully requested.

Section 102 Rejections

Claims 1-2, 5, 8, 10, 13-15, and 17-20 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,202,029 to Verkuil et al. (hereinafter "Verkuil"). As will be set forth in more detail below, the § 102 rejections of claims 1-2, 5, 8, 10, 13-15, and 17-20 are respectfully traversed.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. V. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987), MPEP § 2131. The cited art does not disclose all limitations of the currently pending claims, some distinctive limitations of which are set forth in more detail below.

The cited art does not teach determining a surface voltage of an insulating film from a current to a wafer measured during deposition of a charge on an upper surface of the insulating film. Independent claim 1 recites in part: "depositing a charge on an upper surface of the insulating film; measuring a current to the wafer during said depositing; and determining the surface voltage of the insulating film from the current." Independent claims 14 and 19 recite similar limitations.

For at least the reasons set forth in the Response to Office Action mailed March 11, 2005 filed by Applicant on June 13, 2005 (hereinafter "the prior response"), which is incorporated by reference as if fully set forth herein, Verkuil does not teach determining a surface voltage of an insulating film from a current to a wafer measured during deposition of a charge on an upper surface of the insulating film, as recited in claims 1, 14, and 19.

The Final Office Action states that "the examiner disagrees and believes that the cited art does teach determining a surface voltage of an insulating film (oxide)." (Final Office Action – page 7). The Final Office Action cites col. 3, lines 23-43 of Verkuil as support for this position. However, in the cited portion of Verkuil, Verkuil states that "An increment of charge as determined by the current integrator 26 is deposited on the oxide surface by the corona gun 18 and the voltage V_{ox} measured by the Kelvin probe

20." (Verkuil -- col. 3, lines 33-36). Therefore, Verkuil teaches measuring the surface voltage. Consequently, the portion of Verkuil cited in the Final Office Action supports the position of Applicant set forth in the prior response, which is that Verkuil teaches measuring a surface voltage of an insulating film using a Kelvin probe, not determining the surface voltage. As a result, Verkuil does not teach all limitations of claims 1, 14, and 19.

The differences between the presently claimed methods and the prior art methods impart significant advantages to the presently claimed methods. For instance, as set forth in the Specification,

film leakage may reduce the accuracy and sensitivity of corona-based non-contact electrical measurements of thickness. For example, such measurement techniques are sensitive to film leakage because corona deposition and measurement are not performed at the same time. In addition, accurate time control is difficult thereby reducing the measurement accuracy and sensitivity of these techniques. In addition, at such thicknesses, the film leakage has a non-negligible impact on device performance. Therefore, film leakage is becoming an increasingly important characteristic of insulating films as the thickness of such films is reduced. Measuring film leakage using corona-based non-contact electrical measurement techniques, however, is difficult because the measurement can start only after the charge is deposited and the wafer is moved underneath the measurement probe. In addition, traditional thickness measurement techniques such as ellipsometry do not provide information about film leakage. The methods described herein, however, provide more accurate measurements of insulating film properties and higher throughput than currently available techniques by incorporating simultaneous charge deposition and current to wafer measurements, which can be used to determine a voltage of the insulating film. (Specification -- page 10, line 22 - page 11, line 7).

Since the prior art methods of Verkuil involve depositing a charge on the wafer, moving the wafer underneath the Kelvin probe such that the Kelvin probe is positioned above the charged portion of the wafer (such movement is necessary because corona gun 18 is spaced from Kelvin probe 20 within apparatus 10 shown in Fig. 1 of Verkuil), and then measuring the surface voltage, the prior art methods of Verkuil are less accurate and have a lower throughput than the presently claimed methods.

For at least the reasons set forth above, independent claims 1, 14, and 19, as well as claims dependent therefrom, are not anticipated by the cited art. Accordingly, removal of the § 102 rejections of claims 1-2, 5, 8, 10, 13-15, and 17-20 is respectfully requested.

Section 103(a) Rejections

Claims 6-7 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Verkuil in view of IBM Technical Disclosure Bulletin, Vol. 32, No. 9A, 1990, pp. 14-17 (hereinafter "IBM"). For at least the reasons set forth in the prior response, Verkuil does not teach or suggest all limitations of claim 1, and IBM cannot be combined with Verkuil to overcome deficiencies contained therein. Therefore, independent claim 1, as well as claims 6-7 dependent therefrom, are patentably distinct over the cited art. Accordingly, removal of the § 103 rejections of claims 6-7 is respectfully requested.

Allowable Subject Matter

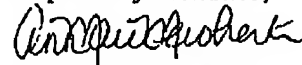
Claims 3-4, 9, 11-12, and 16 were objected to as being dependent upon a rejected base claim, but were deemed allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Applicant appreciates the Examiner's indication of allowable subject matter and awaits allowance of the remaining claims in the case.

CONCLUSION

This response constitutes a complete response to the issues raised in the Final Office Action mailed August 24, 2005. In view of remarks presented herein, Applicants assert that pending claims 1-20 are in condition for allowance. If the Examiner has any questions, comments, or suggestions, the undersigned earnestly requests a telephone conference.

The Commissioner is authorized to charge any fees, which may be required, or credit any overpayment, to deposit account no. 50-3268/5589-05001.

Respectfully submitted,



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